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EXAMINER	
CHANG, AUDREY Y	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)
	10/665,346	YAMAZAKI ET AL.
	Examiner	Art Unit
	Audrey Y. Chang	2872

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 October 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-5 and 7-24* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5, and 7-24* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on **October 26, 2007** has been entered.

2. This Office Action is also in response to applicant's amendment filed on **October 26, 2007**, which has been entered into the file.

3. By this amendment, claims 22 and 24 have been amended.

4. Claims 1-5, and 7-24 remain pending in this application.

5. The reasons for rejection based on the newly added matters set forth in the previous Office Action are withdrawn in response to the amendment and response filed.

Claim Rejections - 35 USC § 112

6. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

7. **Claims 22-24 are rejected under 35 U.S.C. 112, first paragraph**, as based on a disclosure which is not enabling. A first and a second reflective films formed on first and second side of the substrate respective **are critical or essential to the practice of the invention**, but not included in the claim(s) is not enabled by the disclosure. See *In re Mayhew*, 527 F.2d 1229, 188 USPQ 356 (CCPA 1976). Claims 22 and 24 recite a virtually-imaged phased array (VIPA) but it comprises only a substrate.

The specification and the claims fail to teach how could a substrate be capable of forming a virtually-imaged phase array.

8. **Claims 1-5, 7-13, and 14-24 are rejected under 35 U.S.C. 112, first paragraph,** as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Claims 1, 14, 15, 18, 22 and 24 have been amended to include the phrase that "prevents bending of the substrate due to temperature change". The specification fails to disclose how such is possible in particularly when the fixing material is fixed to the first multi-layer film and not directly on the substrate. The specification fails to disclose the information concerning the thermal expansion coefficient of the *first multi-layer film* since the difference of the expansion coefficients between the substrate and the film will cause the substrate to bend when under high thermal influence and it will not be able to be prevented by having the fixing material having the same thermal expansion coefficient as the substrate.

9. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

10. Claims 1-5 and 7-24 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 1, 14, 15, 22 and 24 recite a virtually-imaged phase array (VIPA) comprising a substrate, and a fixing material, however it is not clear how does this fixing material **logically** relate to the substrate

(with first reflective and second reflective films) and the fixing material as to definite defined the function of the "optical device". In particular, the fixing material does not seem to have any optical function which makes it confusing as how does it contribute to optical function in relating to the substrate or the virtually-imaged phase array. This fixing material is therefore interpreted as any kind of adhesive or support means that can hold or support the VIPA.

Claim Rejections - 35 USC § 102

11. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

12. Claims 22-24 are rejected under 35 U.S.C. 102(b) as being anticipated by the patent issued to Okumura et al (PN. 5,969,902).

Okumura et al teaches a *disk substrate* serves as the *apparatus* that is comprised of a *disk substrate* (12, Figure 5), serves as the *substrate* having *first and second sides opposite to each other* and a *support member* (such as spacers 20, shims 30 and clamps 40), served as the fixing material, fixed to the first surface of the disk substrate, that is made of material having approximately the same thermal expansion coefficient as the substrate, (please see column 10, lines 54-69). Okumura et al teaches that the disk substrate can be made of glass material which is transparent to light which therefore defines portion

for the light to enter the substrate and the fixing material is placed at the position that does not block the light from entering the disk substrate (please see Figure 5).

Claims 22 and 24 have been amended to include the phrase that "fixing material prevents bending of the substrate die to the temperature change". Okumura et al teaches explicitly that the thermal expansion coefficients for the substrate and the support member are the same this implicitly requires the same way as the instant application that the fixing material prevents the bending of the substrate.

Although this reference does not teach explicitly that the disk substrate is a "virtually-imaged phase array (VIPA)", however it has been held that a recitation with respect to the *manner* in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus **satisfying the claimed structural limitations.** Ex parte Madham, 2 USPQ2d 1647 (1987).

It is implicitly true that there is means, such as hands or machine, for fixing the support members or fixing material to the first surface of the disk substrate.

This reference has therefore anticipated the claims.

13. Claims 22-24 are rejected under 35 U.S.C. 102(e) as being anticipated by US patent application publication by Cheng et al (US 2003/0030908 A1).

Cheng et al teaches a virtually imaged phase array (VIPA) that has a first side and a second side (Figure 3A) that are opposite to each other. The VIPA further comprises a substrate (110 or 120) and a light input portion that is on the first side of the VIPA and allows the light enters the substrate. Cheng et al further teaches that a plate (100) which is the same material as the substrate (110), which therefore has the same thermal expansion coefficient as the substrate (100, please see paragraph [0032]), that serves as the fixing material that is fixed to the first side of the VIPA and does not block the light from entering the VIPA through the light entering portion. The fixing material or the plate (100) since has the same

physical property will prevent the bending of the substrate the same way as the fixing material recited in the claims.

This reference therefore anticipated the claims.

Claim Rejections - 35 USC § 103

14. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

15. **Claims 1, 5, 7-15 and claims 16-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to Shirasaki (PN. 5,930,045) in view of the patents issued to Spiller et al (PN. 6,134,049), Okumura et al (PN. 5,969,902) and Cheng et al (US 2003/0030908).**

Shirasaki teaches a *virtual imaged phased array* (VIPA) that is comprised of a *substrate* (164, Figures 12(A) or 240 in Figure 13) and *a first reflecting film* (166 or 242) placed on a *first surface* of the substrate and *a second reflecting film* (168 or 244) placed on a *second surface* of the substrate. The two reflecting films each comprises at least one layer and implicitly has a first and second refractive index. **Shirasaki further** teaches *the first reflecting film* (166 or 242) is placed on a *first surface* of the substrate and *the second reflecting film* (168 or 244) placed on a *second surface* of the substrate, and the first and second surface of the substrate are opposite to each other. As shown in Figure 13, Shirasaki et al teaches that the substrate has a light input portion on the first surface of the substrate.

This reference has met all the limitations of the claims. However it does not teach *explicitly* that the first and second reflecting films of multi-layer film structure with plural films. It also does not teach explicitly that the VIPA has a stress correction film formed on the second multi-layer film. It is a rather standard knowledge in the art to make the reflective film with multi-layer structure comprising

alternatively laminated high and low refractive index materials, as explicitly demonstrated by the teachings of **Spiller** et al wherein the reflecting layer has multi-layer structure of alternatively arranged high and low refractive index materials, (please see Figure 1). Such modification would then have been obvious to one skilled in the art for the benefit of using the multi-layer structure to design reflective layers having desired reflection characteristics by varying the structure of the multi-layer films. **Spiller et al** in the same field of endeavor further teaches to compensate or reduce stress of a multi-layer film by placing on *top* the multi-layer film *a film* (13, Figure 1) having a *stress value* that would balance the stress value of the multi-layer film (12) so that a *net stress* may assume value zero, (please see Figures 1 and 2). It would then have been obvious to apply the teachings of **Spiller et al** to add a stress correction layer on top of the multi-layer film of the VIPA for the benefit of reducing the possible damages or distortion to the substrate of the VIPA induced by the stress of the reflecting films and by the expansion of the substrate under high heat environment. Although these references do not teach explicitly that the stress correction film is provided to correct the stress imposed by both reflecting films on the both sides of the substrate, such feature is implicitly included since for the VIPA having the pair of reflecting films, the stress is contributed from both reflecting films and the stress value of the correction film must be selected to compensate the net stress value contributed from both reflecting films.

With regard to the feature concerning the substrate is fixed to a fixing layer having the same thermal expansion coefficient as the substrate, it is not clear what is the logical relationship between the fixing material and the substrate and the optical device it therefore can only be examined in the broadest interpretation. It is implicitly true that the VIPA of Shirasaki must be held by a holder in order for it to be positioned and utilized in an optical system such as shown in Figures 13 and 17-19. This means the VIPA is *fixed* with certain *fixing material* such as a *holder*. It is well known in the art that in a high temperature environment, materials of different thermal expansion coefficient will expand or contract differently, which may cause distortion to the device. It would then have been obvious to one skilled in

the art to make the holder of the VIPA having the same thermal expansion coefficient as the substrate of VIPA, as explicitly taught by **Okumura** et al to make the holder or fixing material (20) and the *disk substrate (12)* with the materials having the *same* thermal expansion coefficient, (please see column 10, 54-69) to prevent distortion or bending to the substrate due to temperature change when held by the support member or the holder for the benefit of eliminating distortion and errors in the substrate and therefore the VIPA filter. **Cheng** et al in the same field of endeavor also teaches to use a holder or fixing plate (100) to be of the **same** material as the substrate (therefore the same thermal expansion coefficient) to reduce issues concerning unbalanced thermal expansion coefficient, to more accurately define the light input portion, (please see paragraph [0032]). By making the thermal expansion coefficients for holder and the disk substrate to be the same, the holder plate prevents the bending of the substrate the same way as the instant application.

With regard to the feature that the fixing material is fixed to the first surface of the substrate, Okumura et al teaches an example of the holder and the disk substrate wherein the holder (20, 30 or 40, Figure 5) is fixed at first surface of the substrate. With regard to the feature concerning the fixing material not blocking the light from entering the substrate, (as recited in claims **1, 14, 15, 16 and 17**), Okumura et al teaches such arrangement explicitly also, (please see Figure 5). It would then have been obvious to one skilled in the art to apply the teachings of Okumura et al to provide a holder for the VIPA device of Shirasaki et al for the benefit of fastening and supporting the VIPA device in place and without causing distortion due to the thermal effect in the environment.

With regard to claim 5, Shirasaki teaches that the VIPA (240, Figures 17-20) may be utilized with a mirror (254) to realize a dispersion compensator.

With regard to claims 7-13, Okumura et al teaches that the fixing material or support member may be made of materials such as ceramics or glass, (please see column 10, lines 59-67). Although these references do not teach that the holder or the fixing material is made of the other various materials as

claimed, such modifications would have been obvious to one skilled in the art to select desired materials having the same thermal expansion coefficient as the holder for the VIPA for the benefit of using a variety of alternative materials as the materials for making the holder that fixes the substrate of the VIPA and at the same time not cause distortion to the substrate. The fixing to the protector plate may be considered as optically jointed.

16. Claims 1-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patents issued to Shirasaki (PN. 5,930,045) in view of the patents issued to Fujii et al (PN. 5,424,876), Okumura et al (PN. 5,969,902) and US patent application publication by Cheng et al (US 2003/0030908 A1).

Shirasaki teaches a *virtual imaged phased array* (VIPA) that is comprised of a *substrate* (164, Figures 12(A) or 240 in Figure 13) and *a first reflecting film* (166 or 242) placed on a *first surface* of the substrate and *a second reflecting film* (168 or 244) placed on a *second surface* of the substrate. The two reflecting films each comprises at least one layer and implicitly has a first and second refractive index. **Shirasaki further** teaches *the first reflecting film* (166 or 242) is placed on a *first surface* of the substrate and *the second reflecting film* (168 or 244) placed on a *second surface* of the substrate, and the first and second surface of the substrate are opposite to each other. As shown in Figure 13, Shirasaki et al teaches that the substrate has a light input portion on the first surface of the substrate.

This reference has met all the limitations of the claims with the exception that it does not teach *explicitly* that the first and second reflecting films of multi-layer film structure with plural films. However it is a rather standard knowledge in the art that reflective film can be formed by multi-layer structure with plural layers of different refractive index materials. **Fujii** in the same field of endeavor teaches a reflective film that is comprised of plural layers of different refractive index. It would then have been obvious to one skilled in the art to modify the reflective layer of Shirasaki et al with plural layers of

different refractive index materials for the benefit of using the multi-layer structure to design reflective layers having desired reflection characteristics.

Furthermore, this reference does not teach explicitly that the VIPA has a *stress correction film* formed *on* the second multi-layer film. **Fujii** in the same field of endeavor teaches to use a *silicon dioxide layer* in a *multi-layer mirror* such that the silicon dioxide layer imposes a compressive stress on the substrate of the multi-layer mirror such that the stress on the substrate resulted from all the other multi-layer films in the mirror may be reduced, (please see column 2, lines 1-49). It would then have been obvious to apply the teachings of **Fujii** to add a silicon dioxide layer to the VIPA as a stress correction layer for the benefit of reducing the possible damages or distortion to the substrate of the VIPA induced by the stress of the reflecting films and by the expansion of the substrate under high heat environment. Although these references do not teach explicitly that the stress correction film (i.e. the silicon dioxide film) is provided to correct the stress imposed by both reflecting films on the both sides of the substrate. Such modification would have been obvious to one skilled in the art since the thickness of the silicon dioxide as Fujii teaches explicitly (please see column 4, lines 3-8), is selected particularly to correct and compensate the *net stress* upon the substrate whether the stress is from one film on one side or films on the both sides. The stress on the substrate is a resultant *net stress* on the substrate and that resultant stress is being corrected by the silicon dioxide layer with selected thickness. With regard to claims 2-4, Fujii teaches that the stress correction film is a silicon dioxide film and its thickness may be adjusted to properly reduce the stress. The thickness of the silicon dioxide film is also selected so that it *does not affect* the optical property of the multi-layer mirror. It is a well-known knowledge in the art that in a multi-layer film structure, in order for the layer not to effect the optical property the layer should have an optical thickness of half or multiple of half of the specific wavelength of interested in order for the light effected by the layer be completely out of phase. Such modification therefore is considered obvious to one skilled in the art so that the silicon dioxide layer will not affect the reflectivity of the reflective

layers (166 or 168). The optical flatness of the substrate being within one wavelength or less is rather standard in the art for the purpose of reducing unwanted scattering of the light at the surface.

Although this reference does not teach explicitly that the stress correction layer is placed on the multi-layer film, however since the net stress of the reflecting mirror is the vector sum of the stress contributed by the reflecting multi-layer and the correction film, to place the stress correction film either on the multi-layer film or under does not effect the purpose of reducing the stress. Such modification would then have been obvious to one skilled in the art for the benefit of designing the reflecting mirror as desired and to fit the particular application requirements.

With regard to the feature concerning the substrate being fixed to a fixing layer having the same thermal expansion coefficient as the substrate, it is not clear what is logical relationship between the fixing material and the substrate and the optical device it therefore can only be examined in the broadest interpretation. It is implicitly true that the VIPA of Shirasaki must be held by a holder in order for it to be positioned and utilized in an optical system such as shown in Figures 13 and 17-19. This means the VIPA is *fixed* to certain *fixing material* such as a *holder*. It is well known in the art that in a high temperature environment, materials of different thermal expansion coefficient will expand or contract differently, which may cause distortion. It would then have been obvious to one skilled in the art to make the holder of the VIPA having the same thermal expansion coefficient as the substrate of VIPA, as explicitly taught by **Okumura** et al to make the disk substrate *support member* and the disk *substrate* with the materials having the *same* thermal expansion coefficient, to prevent distortion to the substrate when held by the support member or the holder for the benefit of eliminating distortion and errors in the substrate and therefore the VIPA filter. Okumura et al teaches that the support member is placed at a position of the disk substrate that does not block the entering of the light into the substrate. **Cheng** et al in the same field of endeavor also teaches to use a holder or fixing plate (100) to be of the **same** material as the substrate (therefore the same thermal expansion coefficient) to reduce issues concerning

unbalanced thermal expansion coefficient, to more accurately define the light input portion, (please see paragraph [0032]). By making the thermal expansion coefficients for holder and the disk substrate be the same, the holder prevents the bending of the substrate the same way as the instant application.

17. **Claims 18, and 20-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to Shirasaki (PN. 5,930,045) in view of the patent issued to Okumura et al (PN. 5,969,902) and US patent application publication by Cheng et al (US 2003/0030908 A1).**

Shirasaki teaches a *virtual imaged phased array* (VIPA) that is comprised of a *substrate* (164, Figures 12(A) or 240 in Figure 13) and *a first reflecting film* (166 or 242) placed on a *first surface* of the substrate and *a second reflecting film* (168 or 244) placed on a *second surface* of the substrate. The two reflecting films each comprises at least one layer and implicitly has a first and second refractive index. **Shirasaki further** teaches *the first reflecting film* (166 or 242) is placed on a *first surface* of the substrate and *the second reflecting film* (168 or 244) placed on a *second surface* of the substrate, and the first and second surface of the substrate are opposite to each other. As shown in Figure 13, Shirasaki et al teaches that the substrate has a light input portion on the first surface of the substrate that allows light to enter the substrate and being reflected between the first and second reflective films.

This reference has met all the limitations of the claims with the exception it does not teach explicitly to have a fixing material. However it is really not clear what is the logical relationship between the fixing material and the substrate and the optical device it therefore can only be examined in the broadest interpretation. It is implicitly true that the VIPA of Shirasaki must be held by a holder in order for it to be positioned and utilized in an optical system such as shown in Figures 13 and 17-19. This means the VIPA is *fixed* with certain *fixing material* such as a *holder*. It is well known in the art that in a high temperature environment, materials of different thermal expansion coefficient will expand or contract differently, which may cause distortion to the device. It would then have been obvious to one

skilled in the art to make the holder of the VIPA having the same thermal expansion coefficient as the substrate of VIPA, as explicitly taught by **Okumura** et al to make the disk substrate *support member* and the disk *substrate* with the materials having the *same* thermal expansion coefficient, (column 10, lines 59-68) to prevent distortion to the substrate when held by the support member or the holder for the benefit of eliminating distortion and errors in the substrate and therefore the VIPA filter. **Cheng** et al in the same field of endeavor also teaches to use a holder or fixing plate (100) to be of the **same** material as the substrate (therefore the same thermal expansion coefficient) to reduce issues concerning unbalanced thermal expansion coefficient, to more accurately define the light input portion, (please see paragraph [0032]). By making the thermal expansion coefficients for holder and the disk substrate be the same, the holder prevents the bending of the substrate the same way as the instant application.

With regard to the feature that the fixing material is fixed to the first surface of the substrate, Okumura et al teaches an example of the holder and the disk substrate wherein the holder (20, 30 or 40, Figure 5) is fixed at first surface of the substrate. With regard to the feature concerning the fixing material not blocking the light from entering the substrate, (as recited in claims **18, 20 and 21**), Okumura et al teaches such arrangement explicitly also, (please see Figure 5). It would then have been obvious to one skilled in the art to apply the teachings of **Okumura** et al to provide a holder for the VIPA device of **Shirasaki** for the benefit of fastening and supporting the VIPA device in place and without causing distortion due to the thermal effect in the environment.

18. **Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over the patents issued to Shirasaki, Okumura et al and Cheng et al as applied to claim 18 above, and further in view of the patent issued to Spiller et al (PN. 6,134,049).**

The VIPA optical device taught by Shirasaki in combination with the teachings of Okumura et al and Cheng et al as described for claim 18 above have met all the limitations of the claim.

This reference however does not teach explicitly that the VIPA has a *stress correction film* formed *on* the second multi-layer film. **Spiller et al** in the same field of endeavor teaches to compensate or reduce stress of a multi-layer film by placing on *top* the multi-layer film *a film* (13, Figure 1) having a *stress value* that would balance the stress value of the multi-layer film (12) so that a *net stress* may assume value zero, (please see Figures 1 and 2). It would then have been obvious to apply the teachings of **Spiller et al** to add a stress correction layer on top of the multi-layer film of the VIPA for the benefit of reducing the possible damages or distortion to the substrate of the VIPA induced by the stress of the reflecting films and by the expansion of the substrate under high heat environment. Although these references do not teach explicitly that the stress correction film is provided to correct the stress imposed by both reflecting films on the both sides of the substrate, such feature is implicitly included since for the VIPA having the pair of reflecting films, the stress is contributed from both reflecting films and the stress value of the correction film must be selected to compensate the net stress value contributed from both reflecting films. Furthermore, one skilled in the art would understand that to place the stress correction layer on the first or the second reflective layer of Shirasaki would function the same in reducing the stress in the layer structure, since the correction layer is designed to correct the net stress introduced by all the layers.

Response to Arguments

19. Applicant's arguments filed on October 26, 2007 have been fully considered but they are not persuasive.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Audrey Y. Chang whose telephone number is 571-272-2309. The examiner can normally be reached on Monday-Friday (8:00-4:30), alternative Mondays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephone B. Allen can be reached on 571-272-2434. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Audrey Y. Chang, Ph.D.
Primary Examiner
Art Unit 2872

A. Chang, Ph.D.